The Xtal Set Society Newsletter

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Let's Get All Wound Up!
By Dan Petersen, W7OIL

My radio experience goes half way back to when Lee DeForest was adding extra wires to a detector in a glass bottle and half as far as Nikola Tesla trying to fry Long Island with his gigantic coils. Things like computers, cell phones, affordable transistors, color TV, female news anchors, ANY news anchor over 45 years of age (Except Walter Cronkite), JFK and annoying environmentalists were all in the future. What we did have aside from banging rocks together was war surplus. There had to be a half dozen surplus stores in San Diego in the 1950's, big ones, and the stuff was cheap. Maybe not to a runny-nose kid but sometimes I could get dear ol' Dad to subsidize me to purchase some treasure that smelled of cosmolene and was painted OD green. This is what got me started on my electronics journey.

This time I wish to elaborate on one particular component that no radio can work without, that lumped inductor called the coil. I say, "lumped inductor" because if you peer into the innards of today's software defined radio all you will see is a computer. Trust me, there are lumped inductances in there, if only in a software engineers program. The coils of which I write are of the old-fashioned wire-and-form kind you see in crystal radios of yore and today.

The coil of choice back then was made from wire scrounged out of a transformer and wound onto a toilet-paper tube. This type of coil is called a "solenoid" or "cylindrical" coil. The tube was not the squishy, environmentally friendly TP tubes of today that you can crush by dropping a Q-tip on them but a paper tube that could be run over by a Sherman tank with no damage. Since I and all my penurious friends did not have the funds to buy something as exotic as a variable capacitor, a coil with a slider for tuning was mandatory. How many turns? Start ¼" from one end and fill it up to ¼" from the other end. Now how scientific was that?! Figure 1 shows a solenoid coil wound on a paper tube. BTW, this example was *not* wound on a TP tube. For a slider-tuned set the bright area on the larger coil would be lightly sanded to expose the copper. The smaller coil is what is called a "link" coil. The antenna and ground would be connected to it. If you were one of the rich kids that could actually afford a real crystal-set variable capacitor (I seem to remember they cost something like 89 cents) then you could tune the set with that and dispense with the slider. I bet there are still thousands of former Cub Scouts that remember their Cub Scout Crystal Radio kit they got for Christmas or their birthday!

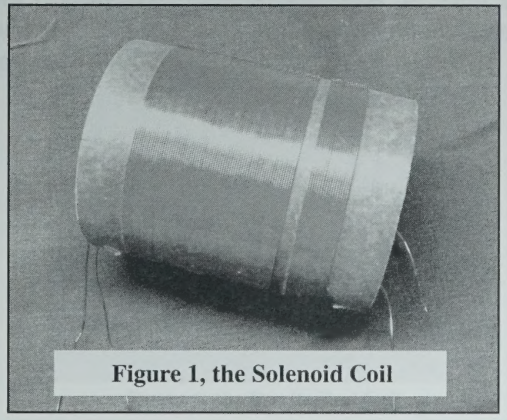

Figure 1, the Solenoid Coil

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Spider, Spider…

While I never got this fancy when I was a kid there was a coil called the "Spider-web" coil. This marvel of engineering was famous as part of a radio you could mail as a letter. This was due to it being flat. Figure 2 is an example of a very fancy one made by a good friend of mine. The details are the same – the form is made from some sort of insulating material, HDPE in this coil. Those who made these coils for mail-radios relied on light cardboard, usually cut from the stiff back of your older brother's pad of paper. The form is made circular and an *odd* number of slits were cut into it from the edge ½ way to the center. You started to wind from the inside and maneuver the wire up through one gap and down through the next. In this fashion the up/down action would repeat every *other* turn creating the distinctive "spider-web" appearance that lends its name to this coil. Now for the geek part. This type of coil exhibits a higher "Q" than a solenoid coil. Simply put, a spider-web coil of identical inductance to its solenoid cousin will tune more sharply, separating stations better. This is because the *distributed capacitance* is much reduced in a spider-web coil as the turns are not in intimate proximity to one another. The inductance of any coil and its inherent distributed capacity makes a tuned circuit (the self-resonant frequency) and if that resonant frequency is below the frequency of interest then it no workee any more as a tuned circuit.

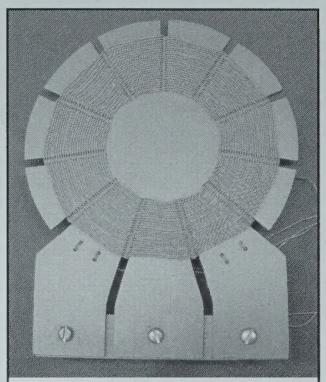

Figure 2, the Spiderweb Coil

Basket Case…

An even more exotic coil is the "basket-weave" coil. This marvel would elicit murmurs of awe from me and my friends when we saw one in an old radio. There is no supporting form. What magic was used to make one of these? Figure 3 shows an example of on of my larger models, six inches in diameter. How did I wind this devil? With what I called the coil loom. I covered the construction of the coil loom in the November, 2005 issue of the Newsletter. The heart of the coil loom is the form shown in Figure 4. The odd number of pegs are held onto the base with a hose-clamp. When winding the coil onto the form I looped the wire *over* one post then *under* the next two. Over one, under two, over one, under two until you are done. In my case I tie all the winds down with thread before I loosen the hose clamp and remove all the posts. This makes for a true "air-wound" coil that contributes its dielectric value to the coil and is self-supporting. Also, the coil has even less distributed capacitance, raising the self-resonant frequency of the coil and its "Q" value. Varnishing the coil even makes it stronger. Not only does a basket-weave coil give you pretty much the ultimate in air-wound coil performance it imparts a certain amount of "coolness" to the appearance of the radio.

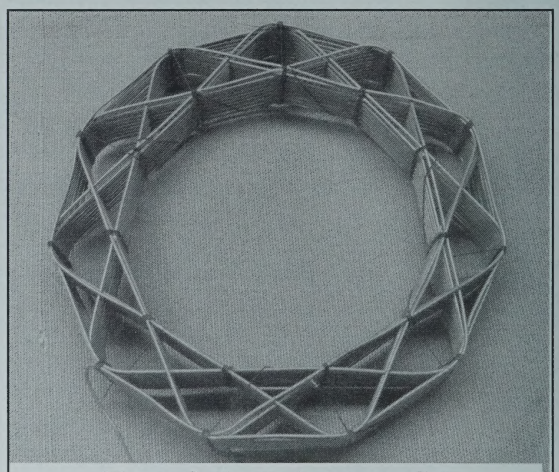

Figure 3, the Basketweave Coil

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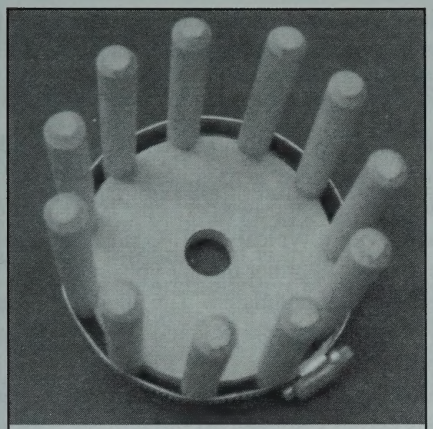

Figure 4, Basketweave Coil-form

Pi Anyone?

Now I shall delve into the realm of mostly manufactured coils, the first of which is the "pi-wound" coil. This includes radio-frequency chokes, and slug-tuned inductors such as the high inductance unit shown in Figure 5 as well as its smaller cousin, the loopstick. These coils are usually wound on a hollow form made of phenolic and are wound in a back-and-forth pattern to reduce distributed capacitance. A much messier homemade coil is what is called a "scramble-wound" coil. I have made successful homebrew scramble-wound loopsticks with good results. A roll-your-own loopstick was covered in the March, 2002 issue of the Newsletter. You'll never guess who the author was. I mentioned that these coils were "slug-tuned". A slug is a ferrite core mounted on the end of a threaded brass rod so that by screwing the rod in and out it varies the inductance of the coil. It also increases the inductance of the coil by acting as a core to concentrate the magnetic field. The loopstick was a fairly common item in the 1950's and 1960's but are as rare as neck scarves for a giraffe now.

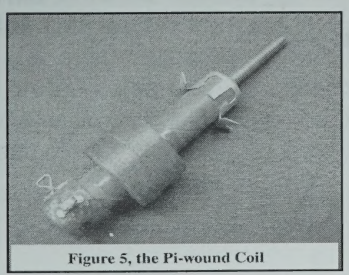

Figure 5, the Pi-wound Coil

Speaking of Ferrites…

Now we come to the final coil in my discussions of types of inductors – The "ferrite-rod antenna". While really an inductor its ferrite core is much longer than the area covered by the windings – usually. Figure 6 shows three different of these beasties and yes, one of them has the windings spread out along the length of the coil. Always a wise-guy in the crowd. These "antennas" are called such because they form the antenna system for the radio. Nary an AM transistor radio lacks one. And that is a prime source of ferrite rods – dead AM radios. The top and bottom rods in Figure 6 are from just such a source – the bottom one being fitted with a mount I made to hold it off the bench while experimenting. The middle one is a Miller #2001 which, if you think neck scarves for a giraffe were rare these are as rare as the jewel-encrusted custom box the scarf came in!

Ferrite rods are large enough to capture the magnetic field emanating from the transmitter. These lines of force act on the coil, which acts as a secondary of a transformer, the transmitter being the primary. The associated tuning capacitor selects the station desired. These make for a very high "Q" resulting in about the best selectivity you can get. The relatively few number of turns result in a lower DC resistance which helps the "Q" as well.

This short monograph does not go into the more esoteric but still common toroidal inductors. My job here is to familiarize the neophyte in the different types of coils and help in the decision as to which one to use for your application. Keep experimenting!

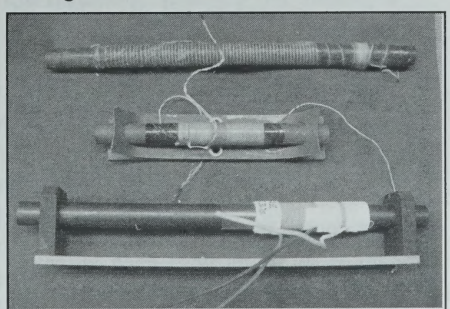

Figure 6, the Ferrite Rod Coil

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No Ground Crystal Set
By Phil Anderson,

Students and hobbyists have often found it difficult to demonstrate a working radio project in a school room or gymnasium setting. Unlike the typical wood structures in homes, most schools and gyms are constructed with steel supports, resulting in substantially reduced radio signals entering the inside of these buildings. This situation is akin to putting a radio inside a nearly totally shielded metal container. The result is reception of weak signals at best. In the case of crystal sets the result is nothing heard! If one lives in a big city like NY or Chicago, a number of 50,000 watt AM stations are available and a sufficient signal is often available. In small towns far from a big city, most local AM stations transmit the maximum 500 watts allowed by the FCC for the local AM broadcast band.

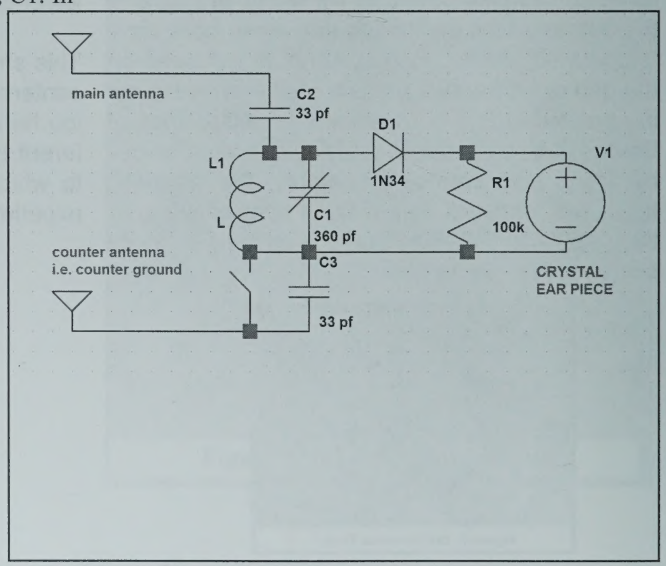
The only remedy for the above is to string two antennas outside the building and run their feedlines through a portal, usually a window, to the inside of the building. Sometimes a good electrical ground is available so only one outside antenna is needed but don't count on it.

The attached AM crystal radio schematic lays out one arrangement that usually overcomes the weak signal situation within a gym. The main antenna is shown at upper left. It feeds the parallel tuned circuit L1, C1. In order to tune the set to a desired frequency, one usually utilizes a variable capacitor and fixed value coil. To tune the complete AM band, 525 to 1550 kHz, L1 has a fixed value, typically 250 uH, and the capacitor is varied from 360 pf to as little as 20 pf (at the top of the band).

If a good radio ground is not available, an alternative is to use a second antenna, usually in a dipole arrangement with the signal antenna, to generate a pseudo-ground. Of course this second antenna has to come from outside the building too. In the diagram we've labeled this antenna as the counter antenna. You may have noted too that we've added one 33 pf capacitor in series with each antenna. These force the impedances of the antennas and their 33 pf capacitors to present a smaller capacitance in parallel with the L1, C1 circuit, thereby transferring the most energy to the radio (see reference 1 for details).

D1 - a 1N34 germanium diode, R1 – a 100k resistor and the earpiece demodulate the AM signal and provide audio for the listener. The 1N34 is preferred, compared with a typical 1N914, since the breakpoint for the diode is .3 rather than .7 volts, allowing weaker signals to be demodulated. The diode presents only positive voltages across R1 and the crystal earpiece. Each positive RF across L1, C1 charges up the capacitive earpiece, and until the next RF cycle appears that charge is partially drained off through the 100k resistor, thus reproducing the audio from the AM signal at the tuned frequency given by L1, C1. The crystal earpiece is actually two circular plates held in place by a plastic case that includes an ear bud.

Ref 1: https://www.midnightscience.net/articles.html then select A GREAT TEACHER to download the file.



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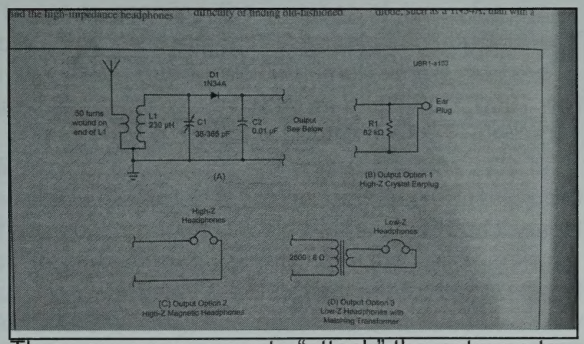
An Online Elmer

I run a radio science program for three home-school associations in Brunswick, GA. We have used your oatmeal box kit in the past with great success. For this next semester, my intermediate level kids are going to build an AM TRF style radio fashioned from the one that is in the ARRL book "Basic Radio: Understanding the Key Building Blocks" by Joel R. Hallas, W1ZR. The copyright is 2005-2015 by the American Radio Relay League, Inc. While sourcing parts, I ran into a problem. The radio calls for an antenna coil that was supplied by Antique Electronic Supply, part number P-C73. It's a 230uH coil. I learned that AES no longer carries this item, and I can't find it anywhere. So, now I am wondering if I am going to need to wind this coil myself. If so, I need advice as to how to make this happen. I'm hoping you can help. Wayne,

There is a coil calculator on our website: www.midnightscience.com.
Go to the website and then along the top click on the FORMULAS PAGE. There you will find the formula for any cylindrical coil and a brief background about it. Also on that page there is a link to pulling up a spreadsheet that you can use – along with an example – to determine the diameter, length and no of turns of wire for your coil. Good luck and enjoy. If the students know a bit about basic algebra.....introduce them to the coil formula. The term uH (micro-henries) is the measure of inductance. Phil, WØXI,

Thank you so much for responding and taking the time to help me out. In looking at the schematic, it appears the antenna coil has two sections, one where the antenna actually connects and the other that couples the antenna to the rest of the circuit. I'm assuming both of these sections are wound on the same rod. Any advice as to how much distance I should have the two sections from each other? Wayne.



There are many ways to "attach" the antenna to the crystal set; here are some methods:

1. Wind an antenna coil and the xtal set coil on the same coil form, separating the edges of the adjoining coils by about a 1/4 inch or so,
2. Wind an antenna coil and a xtal set coil on the same toroidal core, typically an FT82-61 (see our catalog on the website),
3. Wind two coils each on separate coil forms and then install them such that you can adjust the distance between the coils to optimally tune the set.

#3 leads to the best station selectivity for sets.

I explore the details about this process in an article in QEX Magazine, published by the ARRL: QEX – September/October 2008 1. You can also find a copy of this article on our midnightscience.com website. Simply go to our site and then click on ARTICLES and select A Great Teacher: The Crystal Set

If math is your thing, great. If not, don't worry – just skim the article and look at the diagrams to get a feel for the process. Enjoy, Phil, WØXI

Thanks so much. So, if I got this right using the formula on your ferrite rods page, then I would wind the rod approximately 73 times for 230uH. I'm assuming a single layer coil. If I am right, is there any particular wire I should use? I've been reading that litz wire is the best, but I have no idea. In fact, this whole idea of winding inductors is a completely new experience for me. I'm not afraid to try and learn, though. Wayne

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Your calculation is correct – congrats!

N = 1000*SQRT(L in mH/43) = 1000*SQRT(230/1000/43) = 73.

the 230/1000 is to convert the 230 LMH to micro-Henry, i.e. 230uh.

So the length of the coil on the 3 inch rod will be about 1.168 inches.....1000*SQRT(0.230/43).

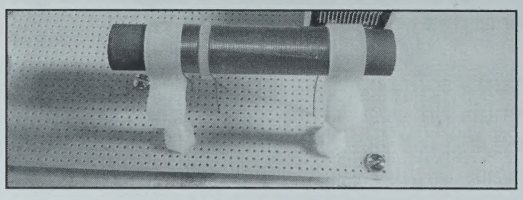
I use 0.230 instead of 230 since the formula calls for L in mH – to convert to uH.

You will not gain much using the Litz on this size of coil with a rod .....go ahead and use #26 enamel wire (see our on-line catalog).

You might consider putting a second rod in series with the first, since the rods might not be long enough for both the antenna coil and xtal set coil.

The diameter of #26 enamel wire is 0.016 inches. Hence the coil length will be about 73 * 0.016 inches = 1.168 inches. Good luck Phil

Ha! It's a bit unusual for me to get something right... LOL. OK, I'm going to give this a try. Actually, I'm looking forward to it. Concerning your formula, is that standardized for your ferrite rods? Would I be able to use that formula for other ferrite rods? I've been reading up on the math behind figuring inductance, at it seems to be "interesting."



I saw your note that I might need two rods in series, but if you have a 5 inch rod, then should that be long enough? I looked on your online catalog and am only finding a 3 inch rod, R-61-50-300-FERRITE-ROD. Do you have a 5 inch rod? Also, I'm assuming the only way I can really test the coil is to place it in series with a capacitor, calculate the expected resonant frequency, shoot that frequency into the circuit and read the output resistance? I do have a signal generator and o-scope (Parallax USB O-scope with signal generator). I could use that to see the output curve--at least, I think that should work. When I order the rod, I'm going to order the wire, standoffs, and the 365pF air gap capacitor. I plan on using these parts for the radio my students will build throughout the next semester, but I've got to proof it first. Thank you so much for your patience. You have been an awesome help. Wayne

I've decided to write an article for the January issue of the newsletter. I'll plan on using two of my 3-inch rods. That way I can adjust the distance between the antenna rod and the radio set rod.....This will be helpful in separating strong AM stations that are nearby in KC. I'm 40 miles west of Kansas City.

Please go ahead and put both you coils on the same rod – you still get the benefit of rotating the complete set to tune in stations, since the rod is directional.

There are two more advantages to using a rod rather than an outdoor antenna: the direction of the rod can be changed which is helpful in separating interfering signals and enhancing the signal wanted. And if I can find one, I'll add an old-style micro-meter as a tuning aid to peak the signal, and also to compare with other stations found. Tuning by ear is not as accurate as tuning with a meter.

When I'm done with the project, I'll send you a paper copy. Please go ahead with your own planning and then you can compare them.

What ages are your students, junior high, high school? While in graduate school, may years ago, I use to teach the basic electronics courses in EE for undergrads. , Phil

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Thank you so much. I'm going to put in my order in the next few minutes. You have been such a great help. I'm looking forward to reading the article. It seems that winding coils is too great of an important skill for DIYers to understand. One other thing I don't have a good handle on is how to secure the winding onto the rod so that the windings don't come loose. Is shrink tubing the best thing for that?

Believe it or not, but my students haven't even reached Jr High yet. Most are 5th and 6th gradish, with a few even earlier than that. I say "gradish" because I provide classes for three homeschool associations. Homeschoolers tend to float between school grades. I only have one student who is in traditional school. I began this program last year after noticing our homeschool association doesn't have much in STEM education. I thought I might be able to do something about that, so I started the Radio Science program. I was afraid it would be a flop, but it ended up being such a hit that two other area homeschool associations reached out to me to see if they could participate. So, I generally run about 20 students per class. I'm now running two classes a week each semester. One is an introductory class where we do a history survey of the development of radio, but we begin from before the telegraph system was an electric system and we run through the beginning of AM radio. They have a hands on project each night including building their own capacitors, building a small replica Morse sender/sounder, and a Morse Code oscillator. Their final project is the oatmeal box crystal radio. The intermediate kids are going to build the AM radio this semester, then I am starting them into digital electronics beginning next year.

I'm confused over something, though. If you look at the attached picture of the schematic for the radio I'm building, it appears that both sides of the variable capacitor are grounded. This shorts the capacitor. Am I reading something incorrectly! I have the ground connections of the coils tied to the capacitor's chassis, and I have the other side of the secondary tied to one of the capacitor's legs.

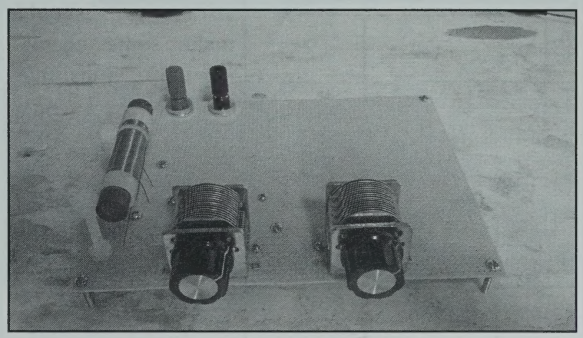
I had no problems being able to vary the capacitance until I made these connections.

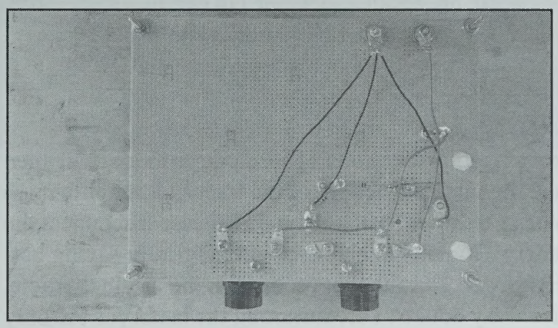
I forgot to mention the number of turns for the coils. The secondary is 73 turns and the primary is 20. AND...this is the first time I've wound coils like this.

Hi Wayne.....if you tie the one side of the coil to the ground of the cap and the other side of the coil to one of the side lugs.....then DC or low frequency wise you will have the coil shorting out the capacitor.....your meter might not like that. Typically, one uses a 0.01 ufd capacitor in series with one end of the coil.....thus not creating a DC connection between each side of the coil at low frequencies. Try adding a 0.01 or 0.01 ufd cap in series with the coil.

Awesome. I'll give that a try. Isn't this something? The thrill of this never goes away for me!

YES!! It works. I'm using a very crappy low hanging antenna, but I'm listening to WCBS out of New Jersey. I live in Brunswick, GA!





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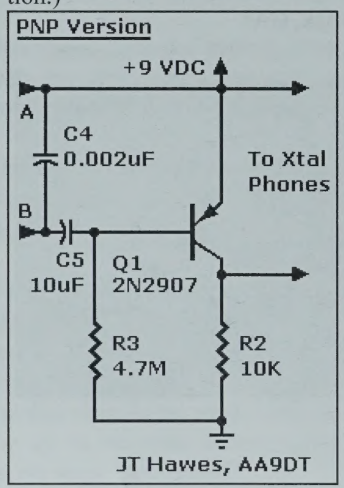
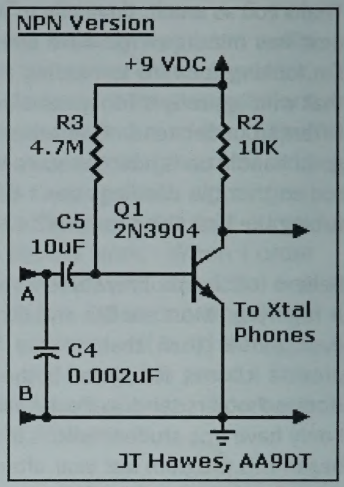
Xtal Corner: Member Correspondence

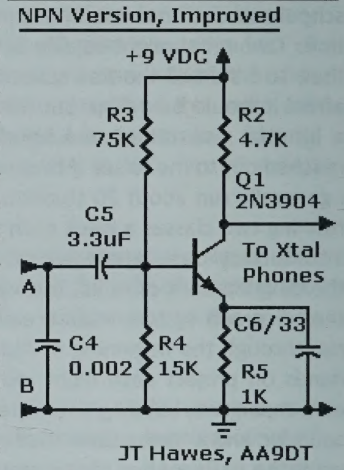
Dear Patricia,
Thanks for the articles on amplified crystal sets. I particularly enjoyed the "Jam Pot AM Receiver" article. This looks as though it might be a scan of an old, public domain article. I checked data for the two recommended PNP transistors (GFT20 and GFT15). As I suspected, these are germanium devices. As well as germanium, these devices are likely to be unobtainium.

I may have a way to replace either transistor with a modern, silicon device. But the result *won't* be a drop-in replacement. The device beta (Hfe) determines the values of the base and collector resistors. In a two-resistor circuit, here is the formula: Rb= 2(Rc x beta). The minimum operating voltage for silicon devices is also greater than for germanium devices. (For silicon, 0.7 volt per junction. For germanium, 0.3 volt per junction.)



To use a silicon transistor, you should make some changes: (1) Substitute a 9-volt transistor battery for the 1.5 volt battery in the article. (2) Capacitor couple the 47K resistor to the transistor base. (3) For safety's sake, wire the crystal phones across the transistor, instead of across the resistor. (More on this in a moment.) (4) Transpose the 10K collector resistor and the battery. The resistor should connect to the collector of the transistor. (5) The battery negative terminal can reverse bias the crystal diode through the 47K resistor. For this reason, you should probably flip the diode. The diode cathode will then face the input capacitors of the transistor amplifier. (6) When you're not using the radio, please disconnect the battery. (I make no claims about magically saving battery power. Despite that promise in the original article, I have my doubts. Disconnecting the battery is the only sure way to save it.)





You could use a 2N3906 or 2N2907, PNP transistor. One of the Radio Shack bargain bag parts (not such a bargain anymore) might work. Make sure that you have a PNP transistor! Capacitor couple Resistor R (47K) to a 3.9M or 4.7M base resistor. (This value depends on the transistor's actual beta. To avoid clipping, you might have to adjust the value.) The audio coupling capacitor value should be 10 uF or larger. There is also an RF filter capacitor, just as in the original circuit. The value remains the same, about 2000 pF. (Same as 0.002 or 0.0022 uF.) See the "PNP Version" schematic. Connect Point A to the top of R1 (47K ohms). Connect Point B to the bottom of R1.

To use an NPN transistor, reverse the battery polarity. Then a type 2N2222A or 2N3904 (or similar) transistor should work. See the "NPN Version" schematic. Connect Point A to the top of R1 (47K ohms). Connect Point B to the bottom of R1.

CAUTION: *None* of these circuits will work with the 32 to 100 ohm (lo-Z) phones from MP3 players. With these circuits, low-Z phones will load down the transistor and might damage the phones. Don't wire a low-Z phone across the 10K resistor. If you did, the transistor and phones might send smoke signals!

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Some people have experimented with using the base-emitter junction of the transistor for the detector diode. This method makes for an even more compact circuit. The 4.7M bias resistor would help to make such a circuit more sensitive. This resistor overcomes the 0.7 volt turn-on voltage. Jim Hawes AA9DT

From Mike Wheatly
I have a question about the number of turns formula for your ferrite (3" x .5") core. N=1000*sqrt(l(mH)/43). I'm new to coil design and need your help. I'm not sure what sqrt, and L represent in your formula. I'd like to build a medium wave xtal set with the hobbydyne circuit design and need to calculate the number of turns for 350uh and 250uh using your core. Hope that you can help. thanks,

Mike
sqrt stands for "take the square root" of ((L(mH)/43) and then multiply that by 1000 to get the number of turns N for the coil (wound on the core).
We are assuming here that you are using the ferrite rod we sell. See the website for that rod.....we only sell the one..... www.midnightscience.com

L in the formula stands for inductance in millihenries for the ferrite rod used. You mentioned using 350 uH which means 350 micro-henry of inductance.
So, you would use 0.35 millihenries (which is the same as 350 uH) in the formula.

So the formula would look like the following.....N = number of turns = 1000*sqrt(.350/43) = 90 turns of enamel wire.

The wire size is #26 which has a diameter of 0.016 inches. Hope that helps. Phil, w0xi

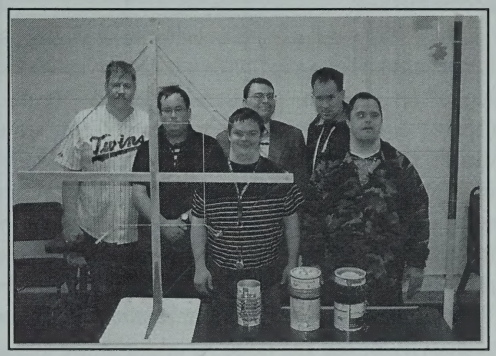
Queen Mum, Your Majesty,

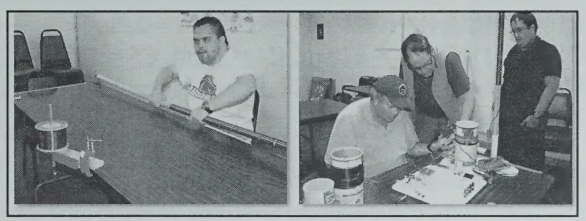
Our local Barnes and Noble bookstore had a Mini-Maker's Faire, and the public was invited to participate.

I work in a classroom setting with adults with a variety of physical and mental disabilities; they accepted my challenge to build some oatbox radios and freestanding antennae's for the Maker's Faire.

They built all three versions of the oatbox crystal sets and wound two antennae's (one an eight foot by 2" PVC pipe with 500 feet of 24 AWG. enameled wire in 50 foot segments, and the other a crossed frame with 70 feet of 24 AWG. enameled wire. They did the 8 footer in sections, so that they each got a turn at winding. And likewise on the three oatboxes.

We had some great teamwork and they were pleased with their results. They did pick up several local stations! Yours in Idaho, Steve Slifer





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Junction Field Effect Transistor and Tube Versions of an Infinite Impedance Detector.
by Phil, WØXI

A weakness/drawback of the traditional diode detector crystal set is that the direct attachment of an earpiece or headphones reduces set selectivity, volume and audio fidelity. With the advent of tubes and then transistors, hobbyists discovered that circuits could be arranged that preserve the crystal set's basic volume and fidelity. We present here two circuits that show how this is accomplished.

Let us assume we start with a basic crystal set consisting of an antenna, parallel LC tuned circuit, crystal (1N34) diode and crystal earphone. Then we remove the 1N34 diode and replace it with the circuit shown in Figure 1. It attaches to the LC tuned circuit and serves as the detector. The first benefit is that the input impedance (of the gate of the JFET) is very high thus preserving the high impedance of the LC tuned circuit. The result is higher RF volume and better frequency selectivity of the LC tank. In addition the added resistance and capacitance, R2 and C2, in the source lead of the JFET improves audio fidelity. C4 is simply a decoupling or feed-through capacitor. The ear piece symbol is the round circle in parallel with R3. Finally, while a battery is used to bias the JFET, this circuit version does not provide any audio amplification. It's not needed since the full LC tuned circuit response has been preserved.

The parts for the diode replacement – the JFET detector - are listed if you wish to try the circuit.

R1 = 1 MEG, R2 = 22k, R3 = 47K, R6 = 2.2k.
C1 = 0.01 ufd, C2 = 470 pf, C4 = 1 ufd, C5 = 1 ufd.
Most any common JFET will do; we generally use a 2N5484 or 2N5486.

Figure 2 presents a triode tube version of the circuit, including component values. Give one of these circuits a try. You'll be surprised and the crisp and clear sound of the audio and better selectivity in tuning in a station.
73s, Phil, WØXI.

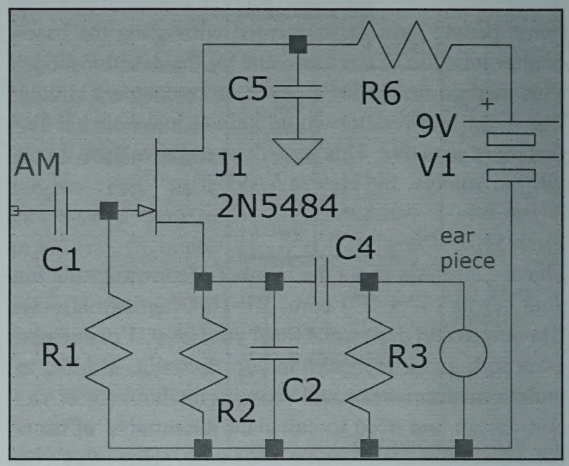

Figure 1

Infinite-Impedance Detector

The circuit of Fig. 5-5 combines the high signal-handling capabilities of the diode detector

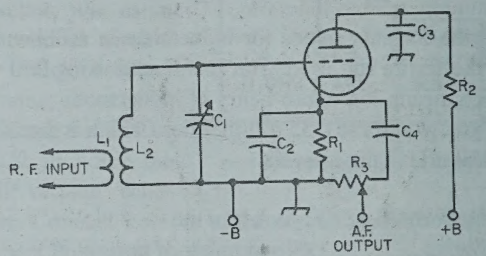

Fig. 5-5—The infinite-impedance detector. The input circuit, L_2C_1, is tuned to the signal frequency. Typical values for the other components are:

C_2—250 $\mu\mu$f. R_1—0.15 megohm.
C_3—0.5 μf. R_2—25,000 ohms.
C_4—0.1 μf. R_3—0.25-megohm volume control.

A tube having a medium amplification factor (about 20) should be used. Plate voltage should be 250 volts.

Figure 2

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We accept checks, money orders, or VISA/MC				
Card#	Exp date:	3 digit code:		
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Address:				
City & State:		Zip code:		
Phone:		E-mail:		
Orders are filled promptly, but allow 2-3 weeks for delivery				

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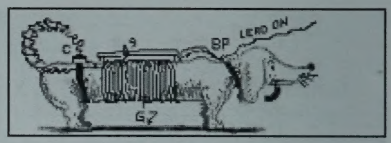


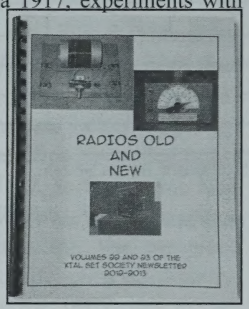
We are dedicated to once again building and experimenting with radio electronics, often—but not always—through the use of the crystal set, the basis for most modern day radio apparatus. This newsletter helps support our goal of producing excellent quality technical books that encourage learning and building.

Please send articles and correspondence to the following address:

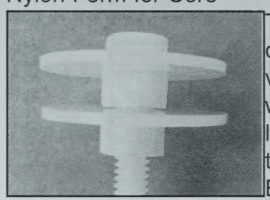
PO Box 3636, Lawrence KS 66046

1. Dear Patricia,
2.
3. Thanks for the articles on amplified crystal

RADIOS OLD AND NEW is volumes 22 and 23 of the Xtal Set Society Newsletter. A wide range of topics and projects are covered in 2012: aerials circa 1917, experiments with regens, grounding and reducing noise in your station, experimenting with spider coils, a 2 for 1 regen set, primer for the 602 mixer at 40 kHz, a modern TRF AM receiver. The following topics for 2013 are: JFET Drain-Output set, a foxhole radio, feedback for beginners, a modern day regen, the universal crystal set, The Albert Hull Memorial Dynatron Regenerative Receiver, adding absorption wave traps, from telegrapher to coherer, a 700 Hz oscillator featuring a quadrature architecture, and more. Vol 23 $15.95



Nylon Form for Core

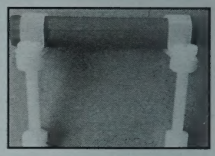


These nylon plastic pieces combine as a form for the various ferrite toroid coils we offer. The form is low loss thus preserving the Q of the coil wound on the form. Extending them above the chassis - which might be metal or fiber board also preserves the coil Q. nycore-frm $2.50

R-L-C-D Assortment

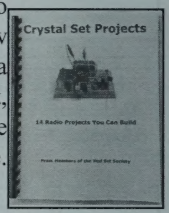
This assortment has nearly all the parts to build a basic am crystal set: 100 pf cap, 330 pf cap, am-band toroidal coil form (ft-82-61), 47k and 100k resistors and a 1n34 diode. RLCD 5.95

Nylon Form for Rod



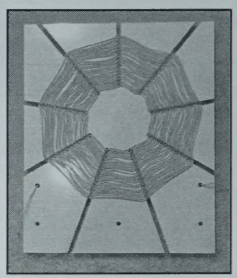
This set of nylon parts combine as a form for the ferrite rod, thus preserving the Q of the rod mounted above a chassis. The Rod is not included. Nylon Form rod $2.50

Crystal Set Projects You Can Build is a collection of 14 radio projects designed by members of the Xtal Set Society. The members hope that by creating this book they will help others to discover this great hobby while at the same time learning basic radio concepts. Here's a sampling: Low Budget Xtal Set, A Loop Antenna Crystal Set, The Den Two Crystal Set, Build a Matchbox Crystal Radio, The triple Tuned Crystal Set and more. XCP $12.95



Spider Coil Form

This 5 by 6 by 1/8th inch ABS plastic form includes nine NC punched radial slots and five mounting holes. This size supports 250 uH coils when used with #22 or #26 enamel, or 150/45 Litz wire found on our website. The coil shown consists of 56 turns of 150/45 Litz, with a 1.6 inner diameter and 4.2 outer diameter. An instruction sheet including formula and table ships with the form. In addition, you'll find the spider formulas for number of turns for a given inductance on our formulas-calculators web page on our main site, www.midnightscience.com Spider Coil Form Cat #SpCO $9.95 each.



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